NEWPORT 2004

DIGITAL PANEL VOLTMETER

OWNERS MANUAL

MP MASTER
MA23748

NEWPORT

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MODEL 2004

DIGITAL PANEL METER

07907ML-01

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WARRANTY

This product of Newport Electronics, Inc. (Newport) is warranted against defective material and workmanship for a period of one (1) year from the date of delivery. Newport will repair or replace all defective equipment returned to it (transportation charges prepaid) during the warranty period without charge provided there is no evidence that the equipment has been mishandled or abused.

If, during the period of this warranty, the product appears to have a defect in materials or workmanship, please call your local Newport representative or write directly to the Customer Service Department, Newport Electronics, Inc., 630 E. Young Street, Santa Ana, California, 92705, and describe the problem.

All products returned to Newport must be insured by sender and must be carefully packaged and adequately protected such as to prevent breakage from shock and rough handling that might occur during shipment; all applicable shipping charges, insurance, duties and taxes must be prepaid by sender.

1.0 DESCRIPTION

1.1 GENERAL

Newport Model 2004 Digital Panel Voltmeter is a low-cost reliable instruments for digital display of analog bipolar voltages. The display is 39999 counts on any of four ranges from 399.99 mV to 399.99 V.

The Model 2004 DPVM is a line powered meter with 14 mm high, 7-segment LED readout. The housing is a break-resistant black phenylene oxide case. Zero adjustment and full scale adjustment are easily accessible with the front lens removed.

Accuracy at the low end of each range is not degraded by normal mode noise because the Model 2004 performs true bipolar signal integration around zero. Many competitive meters rectify the signal before integration which erroneously adds the absolute value of the normal mode noise to the signal reading. The Model 2004 average value circuit provides full normal mode and superior ac line transient noise rejection at signal levels from zero to full scale.

Ratio measurements are possible with the Model 2004 without modifications or external logic. The configuration is 3-wire (common ground) and the reference must be within a specified voltage range.

Data output lines are parallel BCD, compatible with TTL and DTL. External control signals are also TTL and DTL compatible and increase the flexibility and ease of interfacing the Model 2004 with other instruments.

1.2 SPECIFICATIONS

1.2.1 Input

Model	2004-2	2004-3	2004-4	2004-5	Units
Range	0.4	4	40	400	V
Resolution	0.01	0.1	1	10	mV
Overdrive Protection	100	100	250	500	V
Input Resistance	1000	1000	1.1	1	MΩ
Input Bias Current	2	2	0.2	0.02	nA
Reading Tempco (Typ)	.0015	.001	.002	.002	%R/°C
Zero Noise Digits (Typ)	.4	.3			P-P counts
Full Scale Noise Digits (Typ)	.7	.5			P-P counts
Non-linearity	< 1.5	< 1			counts
External Reference Voltage	+.1 → +.4	+1.00 → +4.00			V
Ratio Accuracy [1] [2]	99.95 ±.05				%R
Ratio Linearity	< ±.05 (.03 Typ)				%R
Ratio Input Resistance [3]	260	2.6K			Ω

[1] The HZ option must be used with the 2004-2 to meet specified accuracy.

[2] R40 may be used as a limited ratio accuracy adjustment in Models 2004-3, -4, and -5 (without HZ option).

[3] A higher resistance is available with the HZ option.

1.2.2 Accuracy @ 25°C

Total Error	±0.005%R ±10 µV ±1 count
Offset Tempco	(±2 µV ±.1 count)/°C
Warmup Time	1 hour

1.2.3 Conversion

Technique	Dual Slope, average value
Signal Integration Period	33 mSec (60 Hz); 40 mSec (50 Hz)
Read Rate	3.3/Sec (60 Hz) or2.8/Sec (50 Hz). 0-3.3/Sec (60 Hz) or 0-2.8/Sec (50 Hz) with external control.
Polarity	Automatic

1.2.4 Input Characteristics

Type	Single-ended (analog ground common to signal low)
Settling Time	2 readings (asynchronous input step)
NMR	75 dB @ 50 Hz or 60 Hz
CMR	120 dB @ 50 Hz or 60 Hz
Zero	Automatic
Ratio Measurement	3-wire

1.2.5 Calibration Controls

Full Scale Adjust (R41)	20 turn, accessible behind front lens; ±1.25%, 7.2°/count @ full scale
Full Scale Turnover (R40)	1 turn, factory adjustment only, ±.075%, 5°/count @ full scale
Input Offset (R42)	20 turn, accessible behind front lens; ±25 counts (±2.5 mV), 144°/count.
Zero Width (R39)	1 turn, factory adjustment only; -2 +5 counts

1.2.6 Display

Type	14.2mm (.56"), 7-segment LED
Symbols	-3.8.8.8.8
Decimal Points	Four (to the left of the four LSD's)
Overload Indicator	Display flashes
Polarity Sign	Minus
Color	Red filter

1.2.7 Digital Signals

DIGITAL I/O DRIVE REQUIREMENTS

DESCRIPTION	LOGICAL '0'	LOGICAL '1'	ISINK	ISOURCE	INPUT	OUTPUT
Parallel BCD	0 V - .5 V	2.4 V - 5.0 V	4.8 mA	.4 mA		X
+ POLARITY	0 V - .4 V	2.4 V - 5.0 V	14.4 mA	.4 mA		X
$\overline{\text{HOLD}}$	0 V - .6 V	2.0 V - 5.0 V	.3 mA	1.7 mA	X	
$\overline{\text{DATA READY}}$	0 V - .4 V	2.4 V - 5.0 V	4.8 mA	.4 mA		X
Overload	0 V - .5 V	2.4 V - 5.0 V	4.8 mA	.4 mA		X

1.2.8 AC Power

Input Voltage	115 V ac ±10%
Frequency Range	47 to 63 Hz
Input Power	4.5W (5W max)
Optional Input Voltages	C6 - 115 V ac, ±10%, 50 Hz
	C7 - 230 V ac, ±10%, 60 Hz
	C1 - 230 V ac, ±10%, 50 Hz
	C5 - 100 V ac, ±10%, 50 Hz
	C8 - 24 V ac, ±10%, 60 Hz
	C9 - 24 V ac, ±10%, 50 Hz
	C3 - 5 V dc, ±5% (60 Hz rejection)
	C4 - 5 V dc, ±5% (50 Hz rejection)

1.2.9 Temperature

Operating Temp.	0°C to 50°C
Storage Temp.	-40°C to 75°C
Humidity	Up to 95% non-condensing at $\leq$40°C

1.2.10 Mechanical

Weight	480g
Case Material	Black Phenylene Oxide
Case Size - DIN 1A	
Bezel(WxHxT)	96x48x6 mm (3.78x1.89x0.24 in)
Depth Behind Bezel w/Conn.	135.4 mm (5.33 in)
Panel Cutout	92x45 mm (3.62x1.77 in)

Case Size - NEMA (Optional)	
Bezel	104x48x19 mm (4.09x1.88x0.75 in)
Depth Behind Bezel w/Conn.	125 mm (4.91 in)
Panel Cutout	99.6x42.9 mm (3.92x1.69 in)

2.0 RECEIVING AND INSTALLATION

2.1 UNPACKING AND INSPECTION

Your Model 2004 was fully inspected and tested, then carefully packed before shipment. Unpack the meter carefully and inspect it for obvious shipping damage.

2.2 INITIAL CHECKOUT PROCEDURE

CAUTION

Meters are internally connected for 24, 100, 115 or 230 V ac or 5 V dc power. Check label on meter for proper supply voltage.

2.2.1 Required Equipment

(1) Appropriate power source (5 W) as indicated by the label.

(2) Calibrated voltage source.

Test Procedure

(1) Connect signal as follows:

SIGNAL IN to Pin 17.

ANALOG GND IN to Pin 16.

(2) Connect power as follows:

AC HI to Pin A.

AC LO to Pin 2.

AC GND to Pin C.

(3) Verify that a key is between Pins 3 and 4.

(4) Pins 1, 3 and B must be removed from connector.

(5) Apply power and check that the meter reads correctly for its specified range.

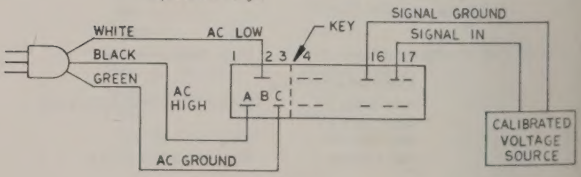


Figure 1

2.3 MECHANICAL INSTRUCTIONS

2.3.1 DIN IA

The drawing number 06896 illustrates the mounting method for your panel voltmeter. The unit is inserted from the front of the panel and held in place by two extrusions. The panel thickness may be between .8 mm (.03") and 6.4 mm (.25").

2.3.2 NEMA (Optional)

The drawing number 05169 illustrates the mounting method for your panel voltmeter. The unit is inserted from the front of the panel and held in place by a "U" bracket. The panel thickness may be between .75 mm (.03") and 6.35 mm (.25").

3.0 OPERATING INSTRUCTIONS

3.1 PIN ASSIGNMENTS

PIN	NAME	PIN	NAME
1	No Connection	A	AC HI
2	AC LO	B	No Connection
3	No Connection	C	AC GND
4	BCD 8	D	BCD 10
5	BCD 4	E	BCD 20
6	BCD 2	F	BCD 40
7	BCD 1	H	BCD 80
8	BCD 800	J	BCD 1 K
9	BCD 400	K	BCD 2 K
10	BCD 200	L	BCD 4 K
11	BCD 100	M	BCD 8 K
12	BCD 10 K	N	+ POLARITY
13	BCD 20 K	P	$\overline{\text{DATA READY}}$
14	DECIMAL POINT B	R	$\overline{\text{HOLD}}$
15	BCD 40 K (Overload)	S	DECIMAL POINT A
16	ANALOG GND IN	T	DIGITAL GND
17	SIGNAL IN	U	Spare
18	Spare	V	REFERENCE HI IN

3.1.1 Connector Type

SAE	#SCC18D/1-2*
ELCO	#00-6007-036-450-012*

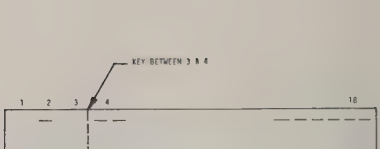


Figure 2
*Pins 1, 3, & B must be removed.

Connector pin orientation as
viewed from the rear of the meter.

3.2 POWER

3.2.1 Input Voltage

The standard meter operates from 115 V ±10%, 60 Hz. It consumes about 4.5 watts. A three-wire connection should be used to connect power to the meter. Two conductors provide power and the third provides a ground for noise rejection. See Section 1.2.5 for optional 50 Hz and 60 Hz input voltages.

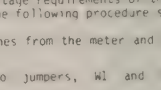
3.2.2 Input Voltage Change

To change the input voltage requirements of the meter from 115 V to 230 V, in the field, the following procedure should be used:

(1) Remove power lines from the meter and remove the meter from the case.

(2) Remove the two jumpers, W1 and W2, located on the transformer.

(3) Add jumper W3 on the printed circuit board. The meter is now wired for 230 V.



To change from 230 V to 115 V input use the reverse of the above procedure.

If other input voltages are required, contact the factory.

3.2.3 Input Frequency Change

The standard Model 2004 is shipped from the factory for 60 Hz operation. If a frequency change is required, the clock frequency must be changed.

The following table summarizes the part changes required to operate from 50 or 60 Hz power.

	50 Hz		60 Hz	
Model	R29	Y1	R29	Y1
2004-2	2.80 k (3)	250 k Hz (5)	2.32 k (6)	300 k Hz (8)
2004-3,4,5	2.80 k (4)	250 k Hz (5)	23.2 k (7)	300 k Hz (8)

(3) ±1%, 1/8W, metal film resistor, NEI P/N 8212801

(4) ±1%, 1/8W, metal film resistor, NEI P/N 8212802

(5) Resonator, NEI P/N 05797

(6) ±1%, 1/8W, metal film resistor, NEI P/N 8212321

(7) ±1%, 1/8W, metal film resistor, NEI P/N 821322

(8) Resonator, NEI P/N 05798

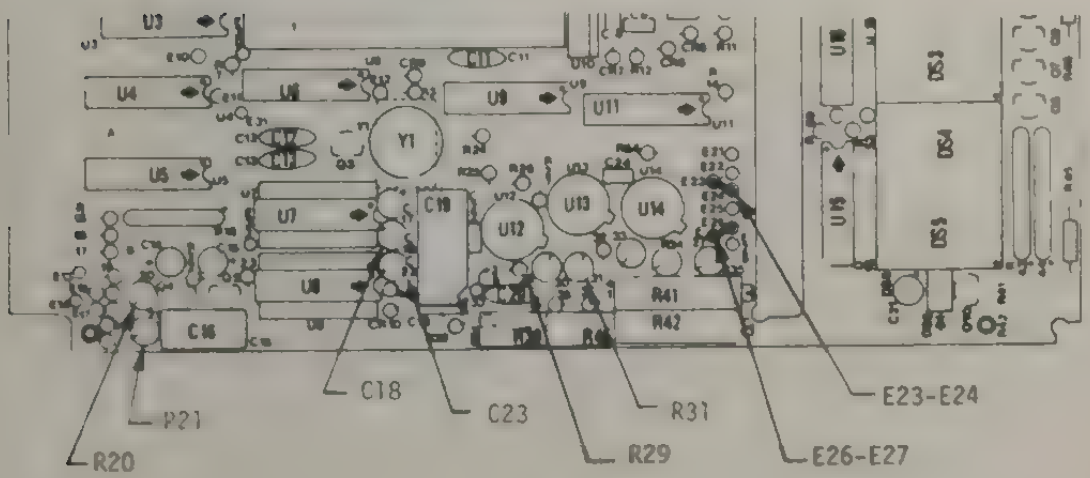
3.2.4 Input Fuse

The Model 2004 has a fusible resistor (F1) located in the primary circuit of T1. If it is suspected that the fuse is blown, check the continuity of the primary circuit. If the meter is wired for 115 V, the resistance will be approximately 125 ohms; if the meter is wired for 230 V, the resistance will be approximately 500 ohms. When replacing the fuse, be certain to use an identical part. Failure to do so will void the warranty. The Newport P/N for the fuse is 8181109, it is an Allen-Bradley, 1/8W, 10 ohm, ±1%, Carbon Composition resistor.

3.3 SIGNAL INPUT

3.3.1 Signal

For best results, shielded, twisted cable should be used for the input signal, with the shield terminated to ANALOG GND IN (Pin 16) at the connector. Analog Ground and Digital Ground are internally connected and should not be connected externally.



3.3.2 Range Change

The standard meter is a 2004-3. To change from ±3.9999 V to ±399.99 mV full scale, use Procedure A; from ±3.9999 to ±39.999 V full scale, use Procedure B; from ±3.9999 V to ±399.99 V full scale, use Procedure C.

PROCEDURE A; from ±3.9999 V to 399.99 mV

1. Remove and replace R29 with a 2.32 k, ±1%, 1/8W, Metal Film resistor (P/N 8212321) for 60 Hz operation or a 2.80 k, ±1%, 1/8W, Metal Film resistor (P/N 8212801) for 50 Hz operation and R28, a 10 k, ±5%, 1/4W, Carbon Film resistor (P/N 8045103).
2. If the PCB is a "B" revision or earlier, remove and replace C18 with 68 uFd, 15 V dip tantalum capacitor (P/N 7211686).
3. If the PCB is a "C" revision or later, add C23, a 33 uFd, 6.3 V dip tantalum capacitor (P/N 7111336).
4. Add R31, 292.1 ohm, ±.1%, 1/8W wire wound resistor (P/N 8529218).
5. Add jumper E26-E27 (P/N 9001401, 1XX.XX d.p.).
6. Recalibrate the meter for +399.99 mV full scale.

PROCEDURE B; from ±3.9999 V to ±39.999 V

1. Remove and replace R21 with a 1 megohm, ±.1%, 1/8W, wire wound resistor. (P/N 8510003).
2. Add R20, 111K ohm, ±.1%, 1/8W, wire wound resistor. (P/N 8511102).
3. Remove and discard jumper E22-23.
4. Add jumper E23-24 for the 1X.XXX d.p. (Decimal Point B, P1-Pin 14).
5. Recalibrate the meter for +39.999 V full scale.

PROCEDURE C; from ±3.9999 V to ±399.99 V

1. Remove and replace R21 with a 1 megohm, ±.1%, 1/8W, wire wound resistor (P/N 8510003).
2. Add R20, 10 k ohm, ±.1%, 1/8W, wire wound resistor (P/N 8510001).
3. Add jumper E26-E27 for the 1XX.XX d.p. (Decimal Point A, P1-Pin 5).
4. Recalibrate the meter for +399.99 V full scale.

When changing any range, the span of the full scale pot may not be sufficient to recalibrate the meter. In this event, R32 604 k ±1% Metal Film P/N 8216043) must be clipped out or soldered into the circuit board. If the meter reads too high, R32 must be soldered in. If the meter reads too low, R32 must be removed.

3.3.3 Ground Precautions

It is essential that the ground connections to the Model 2004 be proper for accurate readings. The input stage is single-ended and analog ground is internally connected to digital ground through a low internal resistance.

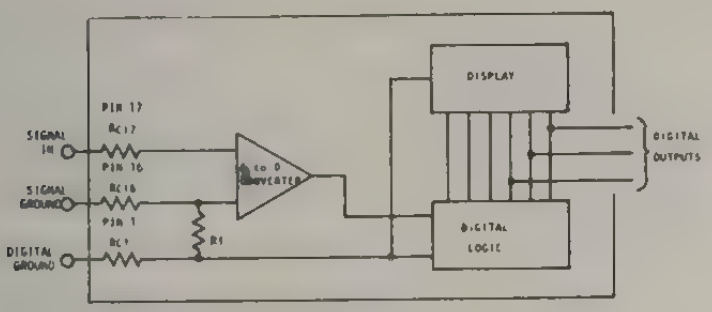


Figure 3

Model 2004 Internal Grounds

The contact resistances resulting from the connection between the connector and the printed circuit board are shown as lumped resistors, RC_{17}, RC_{16}, and RcT. The internal resistance between the analog and digital grounds is shown as Ri.

CORRECT GROUNDING

The correct grounding method is to connect the low side of the signal to ANALOG GND IN and the common for the digital outputs to DIGITAL GND. This allows the digital current to flow only through RcT, causing a voltage drop on the digital line only. There will be no voltage drop across RC_{16} or Ri and the meter will read the signal correctly. There will exist a small voltage difference between Pin 16 and Pin T.

INCORRECT GROUNDING

An improper ground connection is to use a single ground pin for both analog and digital ground. When this is done, the return current for the digital outputs flows through either RC_{16} or RcT. This causes a voltage drop in series with the input signal and the meter reading will be incorrect. An improper system ground connection for the Model 2004 is to tie the two ground connections together at the source. This creates a ground loop and the voltage drop across RcT appears across RC_{16} and Ri simultaneously. This presents an erroneous reading as in the previous case with a single tie point at the connector.

3.4 RATIO

The reference input allows an external voltage to be used as the reference source for conversion. In this mode, the meter reads the ratio of the signal voltage to the reference voltage rather than the true value of the input.

$$\text{Reading in Counts} = 10000 \times \frac{\text{Signal voltage}}{\text{Reference voltage}}$$

On the 40 V and 400 V ranges, the reference voltage must be scaled by 1/10 or 1/100 respectively. The reference input impedance for the 400 mV range is about 260 ohms. For the 4 V, 40 V, and 400 V ranges the impedance is 2.6 k ohms. The reference voltage must be between the limits specified and must be positive with respect to signal low.

3.5 DIGITAL SIGNALS

DESCRIPTION	LOGICAL '0'	LOGICAL '1'	ISINK	ISOURCE	IN	OUT
Parallel BCD	0 V - .5 V	2.4 V - 5.0 V	4.8 mA	.4 mA		X
+POLARITY	0 V - .4 V	2.4 V - 5.0 V	14.4 mA	.4 mA		X
$\overline{\text{HOLD}}$	0 V - .6 V	2.0 V - 5.0 V	.3 mA	1.7 mA	X	
$\overline{\text{DATA READY}}$	0 V - .4 V	2.4 V - 5.0 V	4.8 mA	.4 mA		X
Overload	0 V - .5 V	2.4 V - 5.0 V	4.8 mA	.4 mA		X

DIGITAL I/O DRIVE REQUIREMENTS

3.5.1 Parallel BCD Outputs

The data outputs are parallel BCD and are TTL and DTL compatible. The outputs are stable and valid while $\overline{\text{DATA READY}}$ (Pin P) is low.

3.5.2 + POLARITY (Pin N)

The + POLARITY output is a logical '1' when the meter indicates a positive reading.

3.5.3 $\overline{\text{HOLD}}$ (Pin R)

When a logical '0' is applied to the $\overline{\text{HOLD}}$ input, the meter will finish the coversion cycle it is on and will hold that reading. If it is applied before the beginning of a conversion, the meter will not start that conversion. Upon a logical '1' at the $\overline{\text{HOLD}}$ input, a new conversion will begin within 125 ±8.3 msec.

3.5.4 DATA READY (Pin P)

DATA READY will go to a logical '0' at the end of a conversion cycle and to logical '1' at the beginning of a conversion cycle. NOTE: DATA READY actually overlaps both ends of the conversion cycle; a full clock cycle before conversion starts and a half clock cycle after conversion ends, allowing adequate set-up times for either edge of Data Ready to transfer data (one clock cycle: 3.3 us at 60 Hz operation, 4 us at 50 Hz operation).

3.5.5 Overload (Pin 5)

Overload is the parallel BCD 40 k bit. Overload will go to a logical '1' if the display is greater than 39999. It is stable while DATA READY is low.

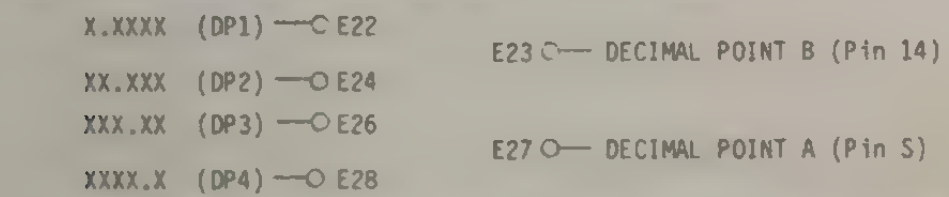
3.6 DECIMAL POINTS

Any of the four decimal points to the left of the four least significant digits can be lighted. The decimal points blank during overload. Two wire jumpers located at the front of the main board select of the two rightmost decimal points and one of the two leftmost decimal points to be controlled by pins on the rear connector. DECIMAL POINT A (Pin 5) is one of the two rightmost decimal points, DECIMAL POINT B (Pin 14) is one of the two leftmost decimal points.

JUMPER	DECIMAL POINT	GROUND P1 PIN
E22-E23	X.XXXX (DP1)	14
E23-E24	XX.XXX (DP2)	14
E26-E27	XXX.XX (DP3)	5
E27-E28	XXXX.X (DP4)	5

DECIMAL POINT CONFIGURATION

Decimal points are lit by grounding the appropriate pin (to J1-Pin T). If a pin is grounded, the grounding device must be capable of sinking .5 mA.



In practice, E23 and E27 can be configured to light any two of the four decimal points in any of the possible combinations.

4.0 THEORY OF OPERATION

The Model 2004 Panel Voltmeter uses the dual slope method of conversion. Many state-of-the-art panel meters use dual slope conversion, but the Model 2004 includes automatic zeroing before each reading and does so with a minimum of parts for increased reliability.

At the beginning of a conversion, the voltage across C_{int} is zero. The signal is then applied to the integrator and the voltage across C_{int} rises by the formula;

$$E_{Cint} = E_{sig} \left(\frac{T1}{R_{int}C_{int}} \right)$$

At the end of a fixed period of 10000 counts (T1), the counters are reset to 00000. The signal input is turned off and a stable reference voltage of the opposite polarity is now applied to the input. Since the reference voltage is constant, the slope, in volts/sec, during this second period (T2) is constant and independent of input signal levels. The time required to discharge the capacitor back to zero volts is then proportional to the signal voltage.

After the clock is stopped by the capacitor voltage reaching zero, a third period (T3) allows the circuit to zero the integrator and comparator for the next reading.

The readings are synchronized to the ac power since the read-rate generator is clocked by the ac line frequency. A '0' on the $\overline{HOLD}$ input prevents the next pulse from starting the counters. The relationship between T1 (signal integrate) and T2 (reference integrate) time can be expressed by the formula:

$$E_{ref}\ T2 = E_{sig}\ T1$$

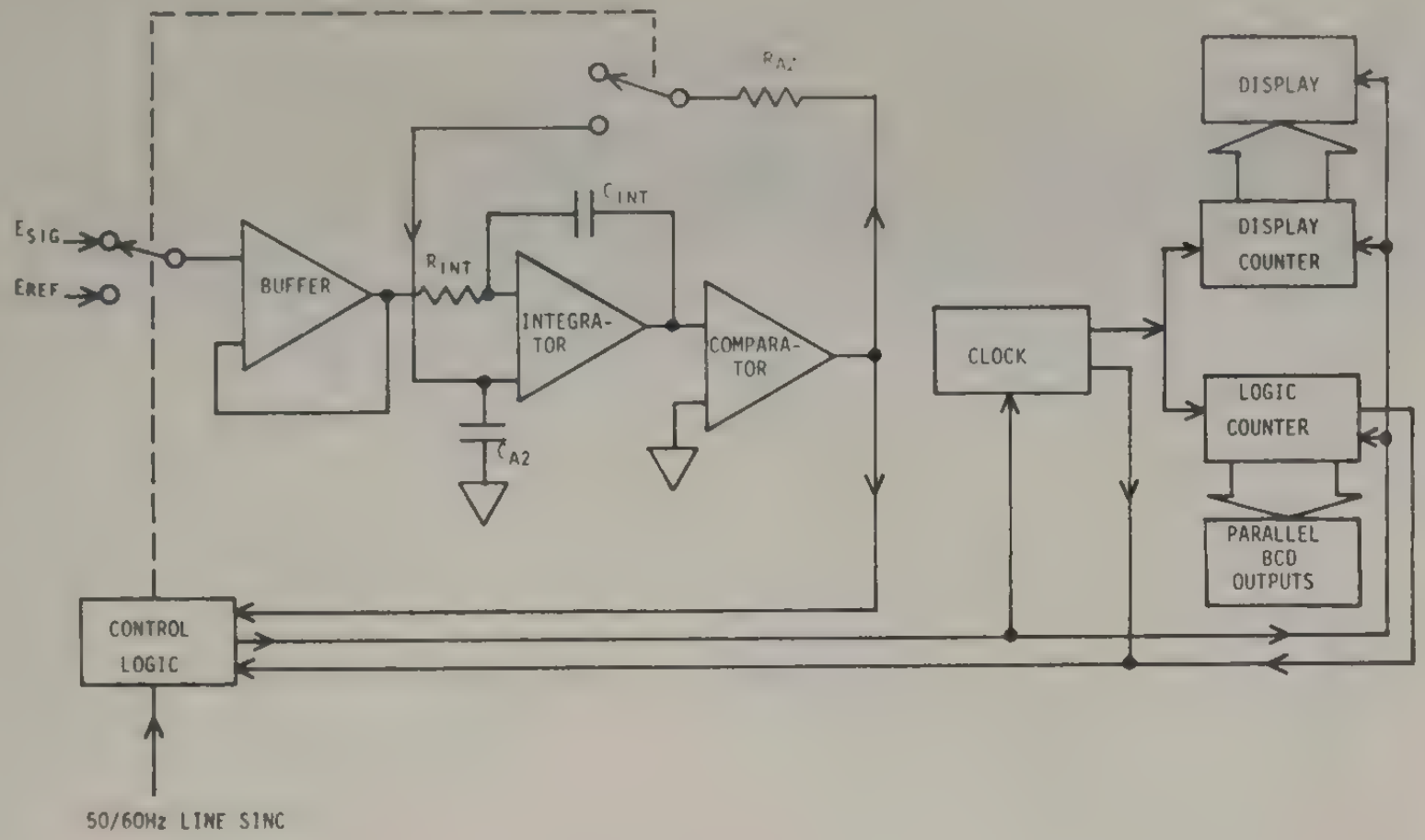


FIGURE 4 - SIMPLIFIED BLOCK DIAGRAM OF MODEL 2003B

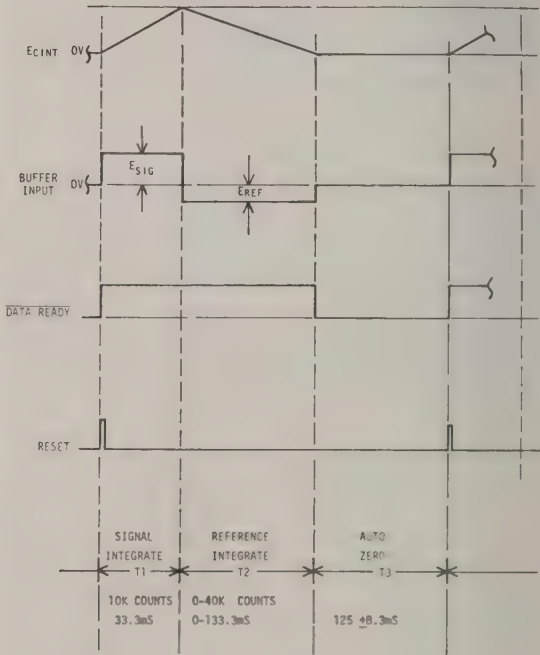


FIGURE 5 - CONVERSION CYCLE WAVE FORMS

5.0 ADJUSTMENT AND CALIBRATION

The Model 2004 was calibrated at the factory with a precision voltage source. Frequent calibration is not necessary due to the stability and internal accuracy of the meter. If recalibration is necessary, use the following procedure:

5.1 Plug the Model 2004 to be tested into an appropriate test cable.

5.2 Turn on the power and adjust for 115 V ac.

5.3 With the voltage source set to 0 V, adjust R42 (input-offset; 200 k) until the polarity sign is bouncing between plus and minus polarity.

5.4 Apply an input signal equal to +10.5 counts and adjust R39 (zero width; 100 ohm) until the display is bouncing bewtween +00010 and +00011.

5.5 Apply an input signal equal to -10.5 counts and verify that the display indicated -00010 or -00011 or bouncing between -00010 and -00011 (the error between + and - polarities should only be a few tenths of a digit).

5.6 Apply an input signal equal to -39000.5 and slowly adjust R41 (full scale; 500 ohm) until the display is bouncing between -39000 and -39001.

5.7 Apply an input signal equal to +39000.5 and adjust R40 (turnover; 50 ohm) until the display is bouncing between +39000 and +39001.

5.8 Using the voltage source, check linearity at 10, 100, 1000, 5000, 10000, 20000, 30000, and 39990 counts. Verify that linearity is not worse than 1 count throughout this range in both polarities.

NOTE: This test requires the effects of zero offset and full scale turnover to be taken into account.

5.9 Using the voltage source, observe the DPM readout.

5.9.1 Check all numbers for proper decoding.

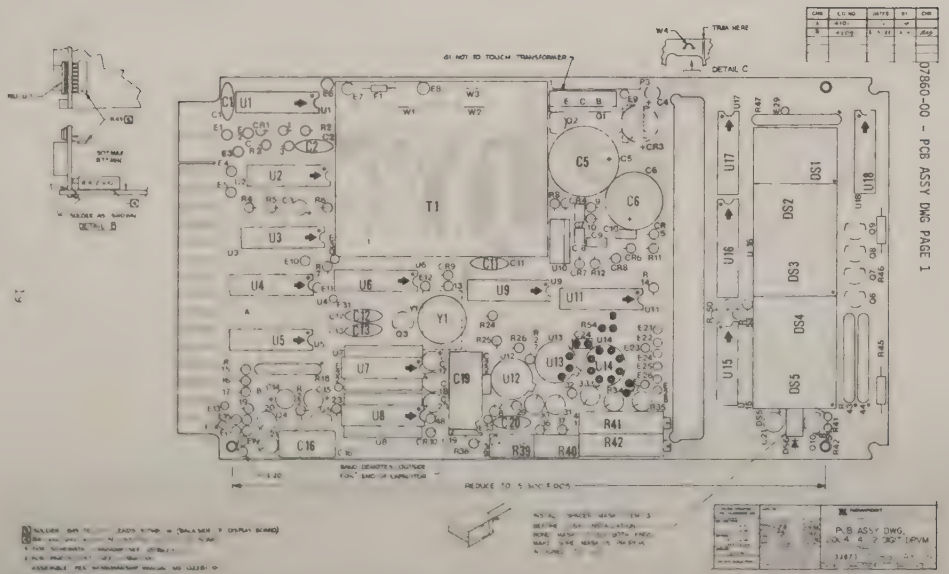
5.9.2 Check for Dim/Dead/Bright segments.

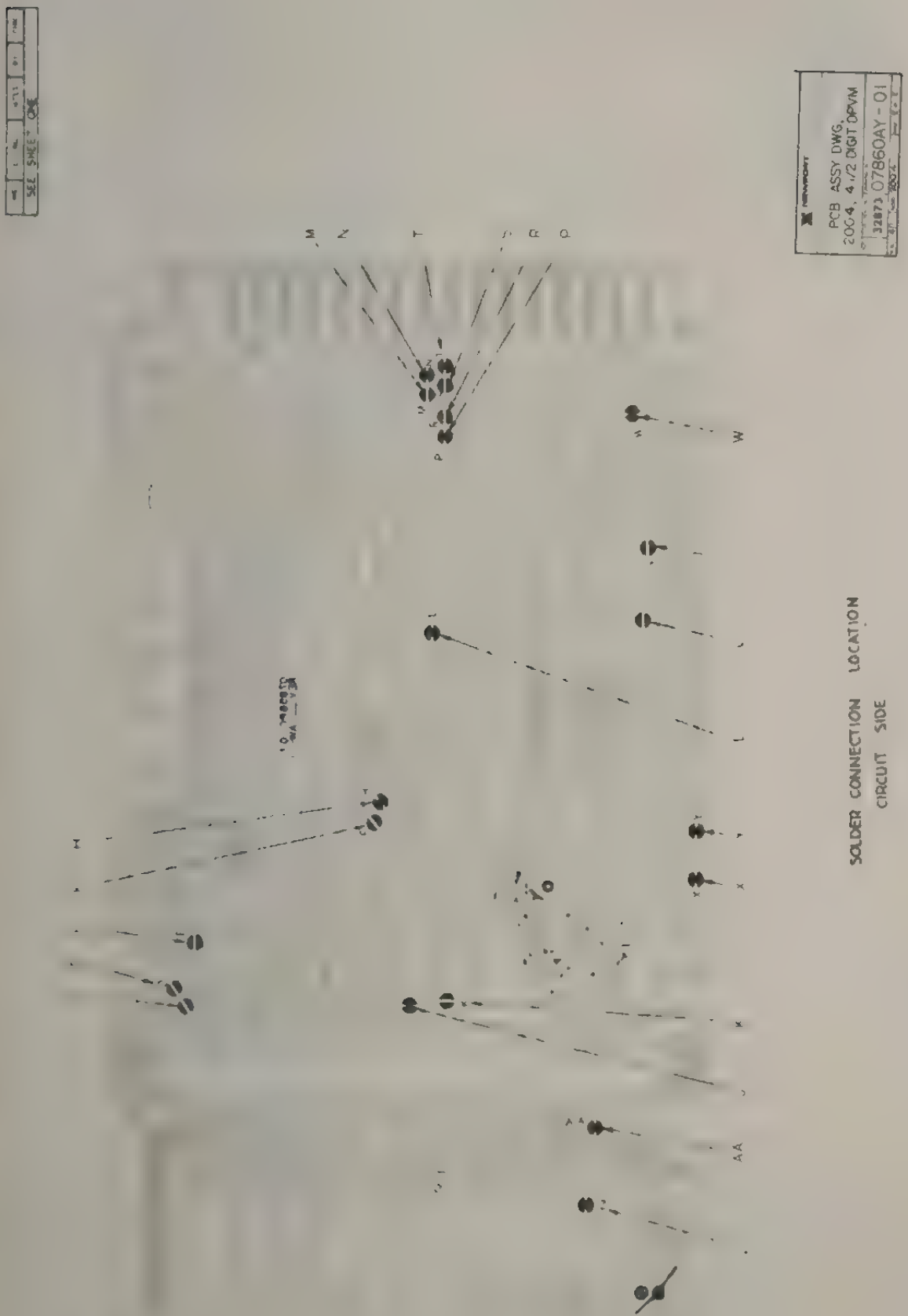
5.9.3 Check individual displays for the same relative intensity/ illumination.

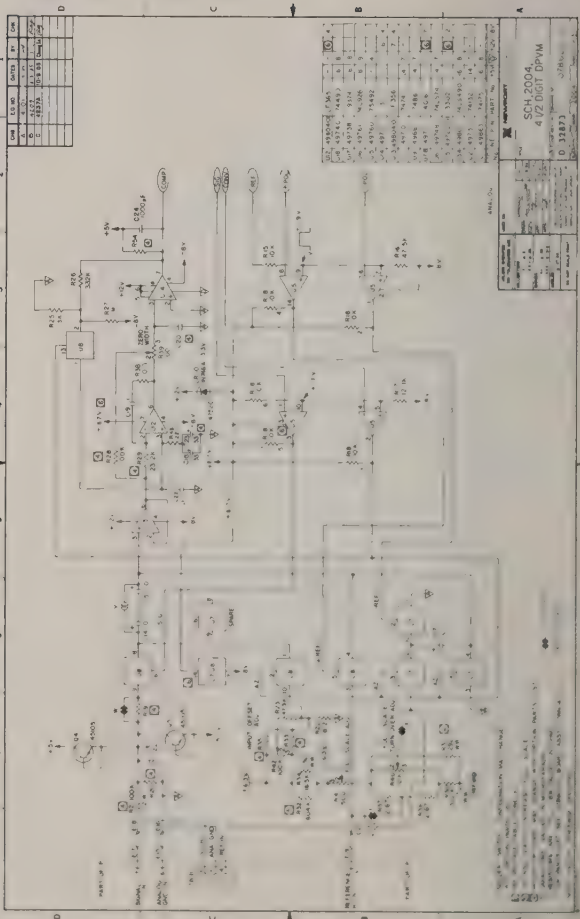
5.9.4 Check minus polarity sign.

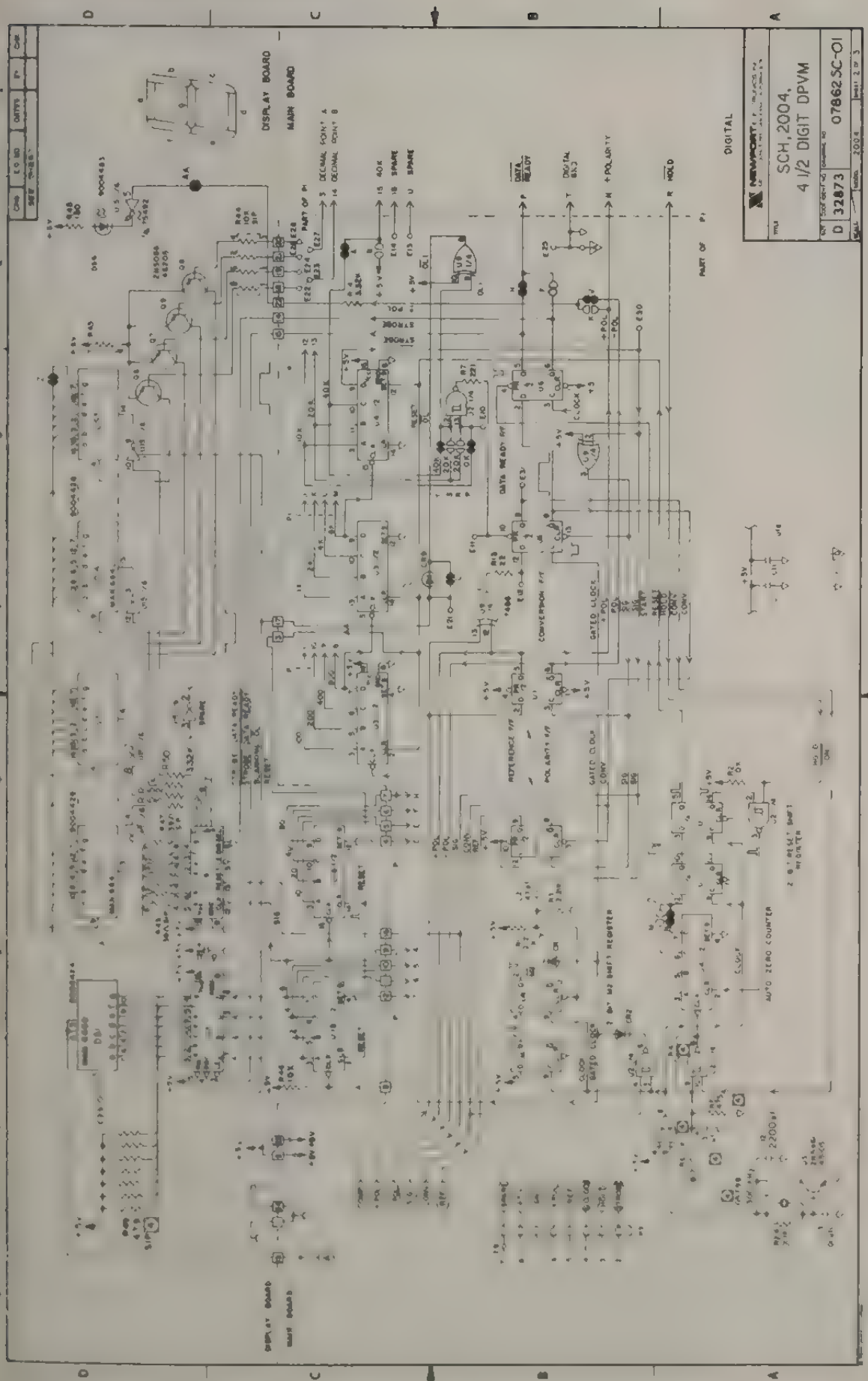
DRAWINGS:

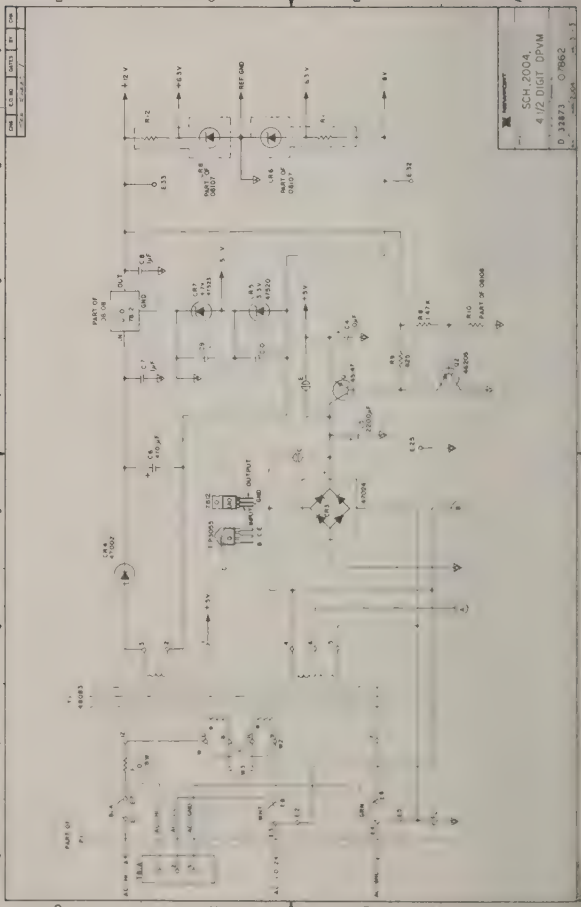
07860-00	PCB ASSY DWG, 2004, 4 1/2 DIGIT DPVM - PAGE 1
07860-00	PCB ASSY DWG, 2004, 4 1/2 DIGIT DPVM - PAGE 2
07862	SCHEMATIC DIAGRAM, 2004 - PAGE 1
07862	SCHEMATIC DIAGRAM, 2004 - PAGE 2
07862	SCHEMATIC DIAGRAM, 2004 - PAGE 3
06896	OUTLINE & MOUNTING DWG. DIN IA
05169	OUTLINE & MOUNTING DWG. NEMA

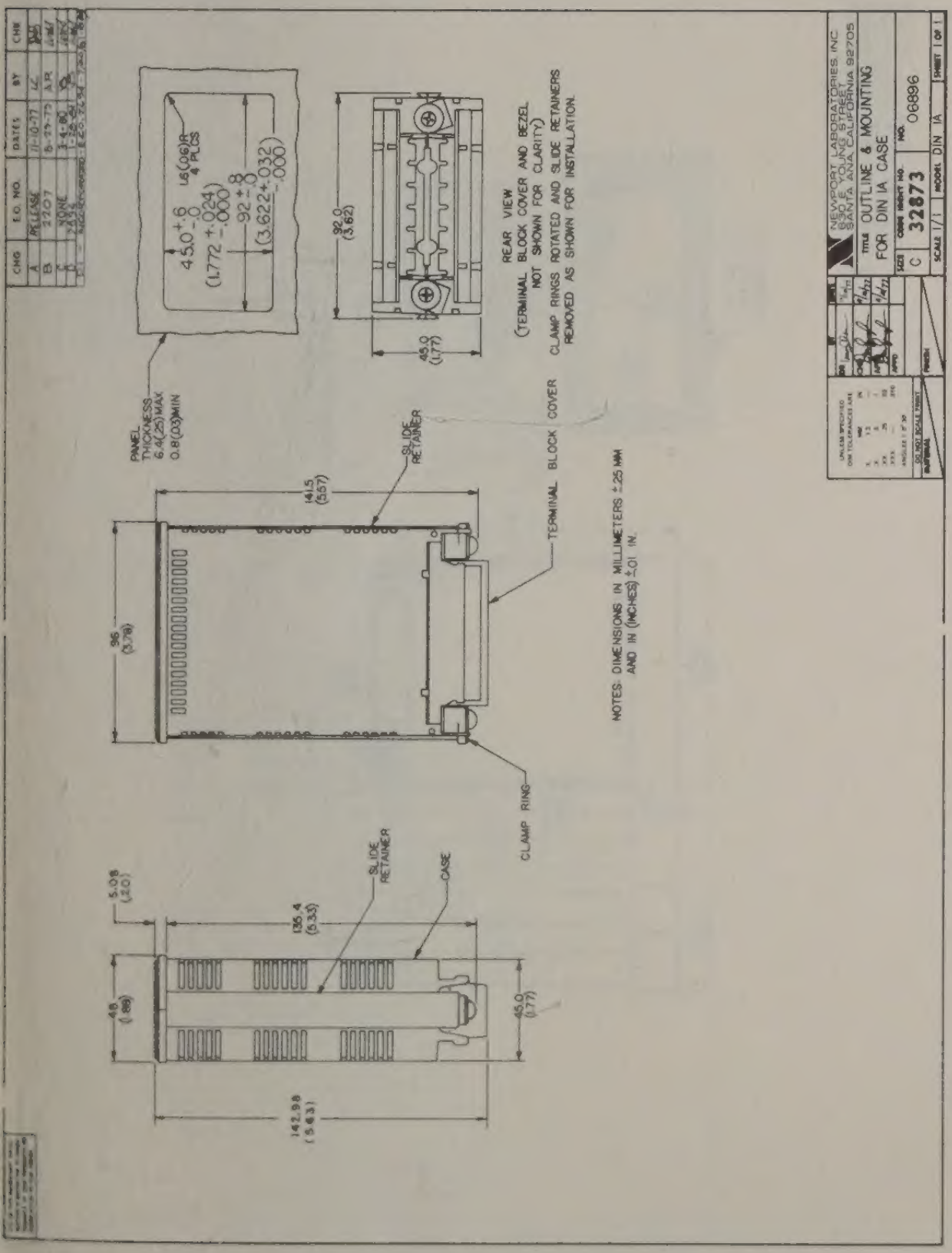

TRIM HERE
DETAIL C
DO NOT RE TOUCH TRANSFORMER
T1
C5
C6
DS1
DS2
DS3
DS4
DS5
U1
U2
U3
U4
U5
U6
U7
U8
U9
U11
U15
U16
U17
U18
Y1
C19
C16
R39
R40
R41
R42
DETAIL B
REDUCE TO 5 SPACES
P.B ASSY DWG.
D7860-00 - PCB ASSY DWG PAGE 1


SOLDER CONNECTION LOCATION
CIRCUIT SIDE
PCB ASSY DWG,
2004, 4 1/2 DIGIT DPVM
07860AY-01

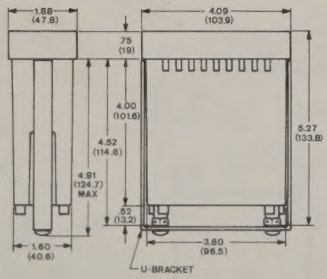

SCH.2004
4 1/2 DIGIT DPVM


SCH, 2004,
4 1/2 DIGIT DPVM
D 32873
07862SC-01
DISPLAY BOARD
MAIN BOARD
DIGITAL


SCH 2004
4 1/2 DIGIT DPVM
D 33873 0 7862
REF GND
OUTPUT
+5V
-5V
+8 V
-8 V

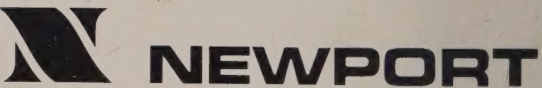

NEWPORT LABORATORIES, INC
630 E. YOUNG STREET
SANTA ANA, CALIFORNIA 92705
TITLE OUTLINE & MOUNTING FOR DIN IA CASE
SIZE C
CABINET HEIGHT NO. 32873
NO. 06896
SCALE 1/1
MODEL DIN IA
SHEET 1 OF 1
REAR VIEW
(TERMINAL BLOCK COVER AND BEZEL NOT SHOWN FOR CLARITY)
CLAMP RINGS ROTATED AND SLIDE RETAINERS REMOVED AS SHOWN FOR INSTALLATION.
PANEL THICKNESS 6.4(.25) MAX 0.8(.03) MIN
SLIDE RETAINER
TERMINAL BLOCK COVER
CLAMP RING
CASE
NOTES: DIMENSIONS IN MILLIMETERS ±.25 MM AND IN (INCHES) ±.01 IN.

CHG	I.O. NO.	DATES	BY	CHK
A	REL	11 Feb 75	[illegible]	[illegible]
B	REL	12 MAR 75	[illegible]	[illegible]



NOTES: DIMENSIONS IN INCHES ±.01
AND IN (MILLIMETERS) ±.25 MM

NEWPORT LABORATORIES, INC. 630 E. YOUNG ST. SANTA ANA, CALIF. 92703			
TITLE	OUTLINE & MOUNTING CASE 05200		
CODE IDENT NO.	SIZE	DWG NO.	
32873	C	05169	
SCALE 1/2	MODEL MULTI-USE	SHEET 1 OF 1	



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